The relationship between the quantity of non-parental child care, family factors and children's aggression

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THE RELATIONSHIP BETWEEN THE QUANTITY OF NON-PARENTAL CHILD CARE, FAMILY FACTORS AND CHILDREN'S AGGRESSION

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Summary

The aim of this article is to investigate whether the quantity of non-parental care is related to children's direct, physical and indirect, relational aggression at age seven, as reported by teachers. Furthermore this study aims to analyse whether this relationship still holds when the influences of ethnicity, gender, maternal education, socio-economic status, and positive and negative parenting are controlled for. This is investigated using data for over 1000 children living in Zurich, Switzerland. When children experienced extensive non-parental care, that is five days a week or more, they showed more aggression. More recent care is more strongly related to aggression, while non-parental care in the first two years of life is not correlated with children's aggression at age seven. Furthermore, the association is stronger for girls than for boys. Categorical regression analyses show that non-parental care is still associated with children's aggression when other factors such as ethnicity, gender, maternal education, socio-economic status, and positive and negative parenting are considered, although child care is not the most important predictor. Gender is the strongest predictor for children's direct aggression, while ethnicity is the strongest for indirect aggression.

Introduction

Today, around 50% of all children under twelve years old in Europe and the United States attend some type of external child care (EMCC, 2006; Lamb & Ahnert, 2006; OECD, 2007; Statistics Netherlands, 2002). Whether external care represents a departure from established patterns of child-minding, or merely its continuation under new forms e.g. financial arrangements (cf. Lamb, 2006; Lamb & Ahnert, 2006), a number of professionals, including child psychologists, sociologists, criminologists and politicians, are engaged in a long-running debate over its effects. Does non-parental childcare benefit or damage children? In assessing external care's effects, one must be careful to separate out the many factors that come into play. Statements about cause and effect are difficult due to the absence of experimental designs in childcare studies, which would control for confounding factors. This situation leads some researchers to suggest that the question whether external care harms children is unanswerable in such terms (Shpancer, 2006; Vandell & Corasanti, 1990). Rather, research can aim to provide "information, insights, and hints … admonitions, warnings, reassurances, and suggestions" (Shpancer, 2006, p. 235) by investigating day-care in different countries, circumstances and groups. This information can help parents and policy makers to make decisions about day-care appropriate to their own situation and their children. In addition, this information is relevant for developmental theories concerning the influence of different care-takers and the role of early versus later experience (Waldfogel, 2002). This study focuses on aggression, behaviour generally perceived as socially undesirable[1]. To prevent children becoming aggressive, it is important to know which factors are associated with aggression and this study can add to the knowledge of the development of aggression. Without contesting Shpancer and Vandell and Corasanti's premise, the aim of this article is to contribute to the debate and available pool of data by seeking to answer the following question: *What correlations can be found between the amount of external child care and the aggressive behaviour of primary school children?*

The relevance of much of the existing research on external care and children's behaviour is circumscribed by the specific circumstances in which it was carried out. Most studies have been carried out in the United States and the situation there is usually not comparable to other countries. Differences can pertain not only between countries but between different cities and states within the U.S. Far from being generalisable between different countries and historical periods, research tends to present contradictory findings. In Sweden, for example, children seem to benefit from non-parental care, while day-care in Texas is linked with detrimental outcomes (Andersson, 1989; Vandell & Corasanti, 1990). Little research has been conducted on day-care in Europe and none, as far as known, in Switzerland, invalidating the conclusions of other studies if applied specifically to Swiss and other contexts (Waldfogel, 2002). This highlights the importance of studying the association between

[1] As Tremblay (2000, p.130) has pointed out, in some situations aggression can be desirable: "Most parents would be proud to hear their child described as an aggressive tennis player. Most sales managers want aggressive salesmen. Most political parties want leaders who can be aggressive when needed".

childcare and behaviour, separately across the range of national and policy-area settings, as this article does this for Zurich.

Most day-care research, further, examines the short-term consequences of children's temporary separation from their parents in terms of its effects on parent-child attachment. Attachment is commonly measured by the "Strange Situation", which consists of a series of stressful events for children: they are with a parent in an unfamiliar room, a stranger enters, the parent leaves and comes back later; attachment is measured according to the child's reaction (Ainsworth, Blehar, Waters, & Wall, 1978). However, situations where parents leave are familiar for children who attend external day-care and they will have developed coping mechanisms. In other words, behaviour that may be interpreted as indicating avoidant or insecure attachment in some contexts here points out children's independence and self-reliance (Schaffer, 1996; Berk, 2000). It is therefore important to measure the behaviour of children in day-care in other ways using other instruments. For that reason this study looks at aggressive behaviour of children around the age of 7.

The question in this article is answered using the data of z-proso, the Zurich Project on the Social Development of Children[2]. This is a longitudinal study of more than 1000 children carried out in Zurich, Switzerland. Z-proso is part of the "Zurich Intervention and Prevention Project at Schools – zipps", which is "a major research and intervention project designed to improve social skills of primary school children and to reduce various types of externalizing problem behaviour" (Eisner, 2004, p. 1). Z-proso has collected information about child care histories and children's current social behaviour after entering primary school. This study aims to look at correlations between the quantity and timing of external care and children's aggressive behaviour in these data.

Several theories try to explain correlations between day-care and children's behaviour. These theories are discussed in the following chapter. After that, this article reviews earlier studies concerning day-care and social and emotional behaviour to give an overview of the current state in research. With the knowledge of the review and theories, research questions and hypotheses are formulated, followed by the Method section, which explains how the study has been carried out. After presenting the results of the analyses in the Result section, the Discussion section will consider limitations and implications for practice and further research.

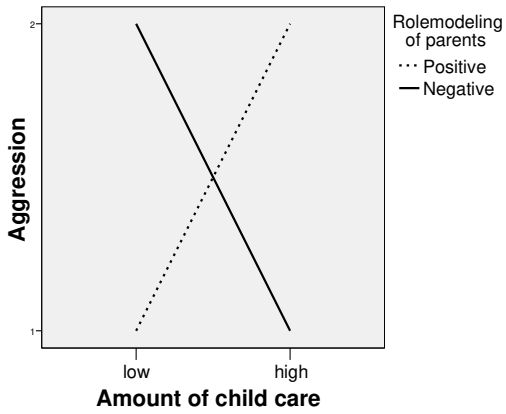
[2] For more information see: http://www.z-proso.unizh.ch/Einleitung/einleitung.en.html

Theoretical background

The theory most investigated, relevant to external day-care, is Bowlby's (1969) theory of attachment. According to this theory children need to form a secure attachment, a positive relationship, with their parents during their first year of life, as this influences their further development. Children attending day-care may not spend enough time with their parents and might therefore be unable to form a secure attachment with them. This may be especially relevant to children who attend day-care in their first year of life. Belsky and Rovine (1988) indeed found that children who experienced extensive non-maternal care in their first year of life were less likely to be securely attached. In the Strange Situation these children showed less distress when their mothers left the room and showed more avoidant behaviour towards their returned mothers. Original attachment theorists would see this as a pathological sign, but as mentioned earlier this behaviour could also be explained as independency and self-reliance. Children have developed this behaviour to cope with the situation of parental leave (Schaffer, 1996; Berk, 2000). It is unclear which explanation, insecure attachment or independency and self-reliance, is most suitable. Therefore it seems more appropriate to concentrate on other aspects of behaviour correlated with non-parental care. By focusing on aggressive behaviour around age 7 and child care in different periods during childhood this study can test the claims of attachment theory. The theory is supported if child care in the first year of life is related to more aggressive behaviour around age 7. If, on the other hand, child care in later years is linked more strongly to aggressive behaviour than the first year, attachment theory is not a suitable explanation for the relationship between child care and aggressive behaviour.

Another theory which can explain the relationship between aggression and child care is Bandura's (1977) Social Learning Theory. This theory states that children learn behaviour through observation and imitation of role models. Parents are important role models, but if children experience much non-parental care their alternative care-takers will also be important in shaping behaviour. One might expect that parents are better social models than external care-takers. The reason is that parents have a genuine interest in their children's development and want their children to grow up as positively as possible and will therefore show more positive role behaviour. On the other hand parents might be unaware of their modelling role and it is clear that not all parents always show positive behaviour. Social learning in external day-care can thus have a positive as well as a negative influence. When parents are very positive, 'good' social role models and external care-takers are not, external child care is likely to have a negative influence on children's development. When, in contrast, parents are 'bad' social role models, external care-takers can serve as a protective factor if they are 'good' social models and can facilitate children's development. Unfortunately, this study does not have information about the quality of the social

Figure 1 Supposed interaction effect between parents role modelling and child care on children's aggression - social learning theory.



role models in the child care environment. It is therefore not possible to test this theory. This study does, however, have information about positive and negative parenting and can therefore investigate if there is an interaction effect between parenting and child care on children's aggression. According to social learning theory one would expect to see more aggression if children experience more child care in combination with more positive and less negative parenting. These children have less time to spend with their positive role models, their parents. On the other hand one would expect to see less aggression if children experience more child care in combination with less positive and more negative parenting. The fewer time children spend with their negative role model parents, the less aggressive their behaviour. This supposed interaction is shown in figure1.

The third relevant theory concerns the amount of experience with other children. Children in external day-care spend more time with peers and day-care is therefore considered as a "socializing experience" (Field, 1991, p. 864). Field (1991) argues that children in day-care show more assertiveness, because they have to be seen and heard among their peers. These children will also show less aggressive behaviour, because of the negative feedback they receive from peers and adults on their aggressiveness. She also hypothesises that these children will develop greater self-esteem, because of their greater social experience. This idea about experience with peers can be linked to Social Learning theory, because peers are also social role models. The effect of learning from these peer role models can be positive as well negative, depending on the behaviour of the peers. It is difficult to test the peer social learning effect with the available data in this study, because there is no information about the peer role models. It is possible, however, to test Field's hypothesis; to accept it, more child care should be related to less aggressive behaviour.

Another related topic is that of deprivation, defined here as the scarcity of attention from adults. It is essential for children's development to have responsive and stimulating interactions with adults. Children in external care with a high child-caregiver ratio will experience less attention from and individual interactions with their external care-takers (Burchinal, 1999). Children whose parents are employed also have less positive interactions with their parents than home-reared children (Nomaguchi, 2006). Research has shown that less positive interactions are correlated to more physical aggression, more anxiety, more hyperactivity and less pro-social behaviour (Nomaguchi, 2006). Non-parental care with few responsive and stimulating interactions with adults can therefore lead to social and emotional problems including aggression. This study has no measures of the quantity and quality of interactions, but assuming that children in child care are indeed more deprived of attention, one would expect to see more aggression when a child experiences more care. Moreover, attention from adults is important throughout the entire development. If this theory is applicable, the data should therefore show that aggression is significantly related to child care in all years, not only in the first year or only in later years.

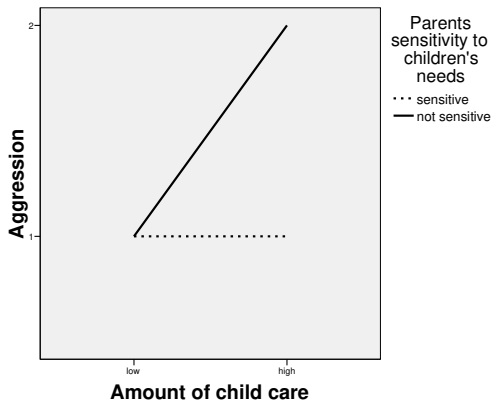
Recently, a more biological theory has been put forward to explain effects of external child care. According to this theory external child care is a form of distress for children which needs to be modulated (Lamb, 2006). In a day-care situation, children, especially those younger than three years of age, show higher cortisol-levels than at home (Vermeer & Van IJzendoorn, 2006). Cortisol is a hormone involved in the regulation of stress and emotions, and is regarded as a valid measure of

stress levels. High cortisol levels are helpful in a distressing situation, but need to be lowered after that situation has passed. Constantly high cortisol levels can cause several health and psychological problems and may be a risk for later social, emotional and cognitive functioning (Kalat, 2001). Children need responsive parents back at home to lower their cortisol levels. If they experience extensive external care and have non-responsive parents, their cortisol levels will stay high, which will interrupt their development (Lamb, 2006). Linked to this is the possibility that it is hard to be a responsive parent while working, because combining being a parent and working at the same time can be stressful (Clarke-Stewart, 1988 in Howes, 1990).

Moreover, it appears that children's temperament and the quality of child care moderate the rise in cortisol levels. More emotionally negative children, children with lower self-control and children in lower quality care have a greater increase in cortisol levels (Dettling, Parker, Lane, Sebanc & Gunnar, 2000). As a result, these children are more at risk for negative effects of external care. Furthermore, children with a difficult temperament elicit less sensitive care-giving from and experience less positive interactions with parents and external caregivers (Crockenberg & Leerkes, 2003). Hence, children who already have a difficult temperament will experience more stress in day-care and less positive interactions with adults, which can both lead to more problem behaviour (Nomaguchi, 2006). Due to this complex interplay it is hard to draw conclusions about cause and effect. If children show problem behaviour it is difficult to know whether this is caused by experiences in day-care, difficult temperament, several of the other factors mentioned earlier or an interaction of different influences. This only emphasises the importance of studying child care and the various factors correlated to contribute to the available knowledge.

This study cannot test this theory, because there is no information about children's cortisol levels. It is, however, possible to look at the interaction between sensitive, positive parenting and child care on aggressive behaviour. Assuming that external care is stressful for children and that children's stress needs to be modulated by parents to prevent aggression, one would expect the interaction shown in figure 2. If parents are sensitive to children's needs, stress resulting from a large quantity of child care will be modulated and children will show little aggression. If parents are not sensitive to children's needs and children experience a large quantity of child care, resulting stress levels will stay high and children will show more aggression.

Figure 2 Supposed interaction effect between parent's sensitivity and child care on children's aggression – stress modulation theory.



The above discussed theories assume a genuine relationship between day-care and children's behaviour. It could be possible, however, that the relationship between non-parental care and children's behaviour is a spurious one. In that case, it is not child care that causes children's aggression, but one or more other variables that are both related to child care and aggression. These variables are called selection factors, because they influence the selection of the quantity, quality and

type of care. Research has shown that maternal education, income and ethnicity influence the type and amount of child care, but also the development of children's behaviour (Bacharach & Baumeister, 2003; Burchinal, Ramey, Reid & Jaccard, 1995; Lamb, 1997). It could be, for example, that aggressive children are more likely to be from low-income families[3]. If these low-income families also use more child care, because they need to work more hours to get enough income, their children are likely to experience more child care. In this situation, child care and aggression are correlated, but the 'real' association is through low income and there does not have to be a causal link between child care and aggression. If the relationship between child care and aggression is indeed a spurious one, the correlation between child care and aggression will vanish when the influence of other factors is considered.

Summarizing the theories, external child care is likely to have a positive effect when children experience many positive interactions with and attention from care-takers and many positive interactions with peers, while they have positive, responsive parents who modulate the stress they experience in day-care. When this is the opposite, child care is likely to have a detrimental impact. While studying correlations between child care and children's behaviour, it is therefore important to look at parenting practices as well. Not only will parental care influence children as described above, but characteristics of families are linked with certain types of child care (Belsky & Eggebeen, 1991; Howes & Olenick, 1986; Nomaguchi, 2006). In this study positive and negative parenting, socio-economic status, maternal education and ethnicity will be used as controlling variables, while investigating correlations between the quantity of child care and children's aggression. There are many variables, which could be important in the relationship between child care and aggression, but research has shown that the above mentioned variables seem to be most important. Furthermore, the association will be investigated for boys and girls separately. The reason to do this is that other studies have shown that boys are more sensitive to child care experiences than girls (Howes & Olenick, 1986; Votruba-Drzal, Coley, & Chase-Lansdale, 2004). Before moving on to the details of the present study, the existing literature on this topic will be reviewed in the next chapter.

[3] There is no clear relationship between income and aggression, but Kandel-Englander (1997) points out that people who are violent outside the home are more likely to come from lower class.

Review of existing literature

Many researchers have conducted studies concerning child care. Some of these studies involve infants' behaviour or attachment, while others relate to toddlers' behaviour. This study, in contrast, examines children's aggressive behaviour around age seven. Enabling comparison of this study's results with previous findings, only studies which meet certain criteria are included in the review. Using these criteria and an organised search strategy this review attempts to be as systematic as possible. Nonetheless this is not a full systematic review (as described by Petticrew and Roberts, 2006), since this was not the main purpose of this thesis. Studies are included in the review if they meet the following criteria:

Inclusion criteria

Outcome measure – social or emotional behaviour

Participants – children over four years old at time of behavioural assessment

– minimum number of participants: 100

Time-span – studies published during the last 20 years, from 1987-2007.

Type of child care – 'normal' child care available for everyone

– child care measured from birth up to the time of measurement

For the sake of clarity, studies that look at cognitive outcomes or school performance and studies that only look at early intervention programmes, especially targeted to enhance development, are excluded. Studies that only look at current child care or child care during the previous one or two years are also excluded (e.g. NICHD, 2004).

Search strategy

Two electronic databases were searched: Online Contents and PsychInfo. Online Contents was searched with the terms 'child care', 'day care' and 'external care' with subsequently 'effect', 'influence', 'correlation', 'relation', 'behaviour' and 'behavior'. PsychInfo was searched for the period '1985 to March Week 3 2007' with the term 'child day care' and subsequently 'effect', 'influence', 'correlation', 'relation', 'behaviour' and 'behavior'. References to relevant articles, papers, books and chapters were searched as well, especially the ones in Belsky (2002), Burchinal (1999), Lamb and Ahnert (2006), Shpancer (2006) and the ones in the studies considered for and included in the review.

Studies

This search strategy and criteria have led to ten publications eligible for review here, which are shown below in table 1 (overlay). One study, which covers two publications (Andersson, 1989; 1992), was carried out in Sweden; another study (Nomaguchi, 2006) was carried out in Canada; the remaining seven studies were all carried out in the USA.

Table 1 Characteristics of studies included in review

Study	**Andersson, 1989 and 1992**
Participants	119 and 114 (original sample 128) low- and middle-resource children, living in large cities in Sweden, in high quality, state-provided day-care, behavioural outcomes at age 8 and 13.
Method	Retrospective information about day-care till age 3-4, teacher reports at follow-up ages 8 and 13.
Outcomes	Teacher reports on socio-emotional performance: persistence and independence, social confidence, short temper and impulsivity, peer contacts, verbal facility, attentiveness vs. distractibility, anxiety, assertiveness, transition preschool-school. At age 13: composed measure of school performance and socio-emotional competence.
Controls	Gender and home background (SES)
Conclusion	**Positive effect of early day-care.** Timing matters: entering day-care between 6 and 12 months predicts a positive effect. At age 8 these children are more persistent and independent and less anxious. When they are 13 years old these children are more creative, socially confident, popular, open and independent. The author suggests a pathway model of SES, family type, gender, IQ, age of entry and social competence.

Study	**Bacharach & Baumeister, 2003**
Participants	13,288 5.5-year old children from 'The Early Childhood Longitudinal Study, Kindergarten Class of 1998-99', 49% male, 65% White, 17% Black, 11% Hispanic, from diverse socio-economic and ethnic backgrounds.
Method	information about child care is retrospective, information about behaviour is prospective from kindergarten-age.
Outcomes	Teacher reports on externalising problem behaviour: child argues, fights, gets angry, acts impulsively and disturbs class activities.
Controls	-
Conclusion	**Selection effects explain differences in behaviour.** Head Start and relative care children are more likely to show extreme behaviour problems, but it is likely that this is due to selection effects rather than experience in day-care.

Study	**Bates, Marvinney, Kelly, Dodge, Bennet & Pettit, 1994**
Participants	558 5-year old children from diverse socio-economic backgrounds, 17% African-American, 52% male, 24% from single-mothers.
Method	3 months follow-up after starting kindergarten, parent, teacher and child reports. Child care is measured retrospectively.
Outcomes	Composed measures of positive and negative adjustment in kindergarten, reported by parents through questionnaires (e.g. CBCL) and children through a social-cognitive problem-solving test.
Controls	SES, mother stress, marital status and gender.
Conclusion	**More, rather than early, day-care is positively and negatively related to behaviour.** Not timing, but the total amount of care matters. There is a negative and positive effect: large amount of day-care predicts more negative and less positive adjustment, but less internalising problems.

Study	**Belsky, 2006**
Participants	more than 1000 4.5-year old children from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care.
Method	Prospective with mother, caregiver and teacher reports.

Outcomes	CBCL, Social Skills Rating Scales.
Controls	family composition, marital status, socio-economic status, family functioning, maternal wellbeing, quality of mothering and quality of child care.
Conclusion	**More time spent in child care predicts more externalizing (but not clinical) problem behaviour**, irrelevant of quality.

Study	**Belsky & Eggebeen, 1991**
Participants	1,248 4 to 6-year old children from the National Longitudinal Survey of Youth (NLSY), disproportionately from poor, very young, under-educated mothers.
Method	Longitudinal study, Quasi-experimental.
Outcomes	Compliance, inhibition, attachment insecurity, sociability, and behaviour problems as reported by mothers.
Controls	poverty, race, birth order, gender, temperament and several mother, family and household characteristics.
Conclusion	**No relation between non-maternal care during first year of life and behaviour, but less compliance when children experience extensive maternal employment during their first two years of life.** Child care arrangements are correlated with background factors. Furthermore there is no relation with full time non-parental care in the first year of life, but the author suggests that the absence of quality measures can explain this. Extensive maternal employment during the first two years, however, is associated with increased behavioural maladjustment and non-compliance.

Study	**Burchinal, Ramey, Reid & Jaccard, 1995**
Participants	333 lower middle-class and upper middle-class 6 to 12-year old children in the Washington Family Behaviour Study, from single and two-parent homes, with one, two or three or more children, 80% white/non-Hispanic, 20% African-American.
Method	Retrospective information about child care, interview assessments during home visits, no information about quality.
Outcomes	CBCL and observer's, mother's, father's and children's ratings of the child's social development.
Controls	Parent-child relationships, child, parent and family characteristics (such as marital status, number of children, ethnicity, occupational prestige, gender and age).
Conclusion	**No effect of care during infancy, positive effect of centre care for African-American children.** Non-parental care during infancy is not related to behavioural outcomes. African-American children with centre preschool experience show more positive behaviour than those without. The selection and the quality of child care is related to child and family characteristics.

Study	**Nomaguchi, 2006**
Participants	1248 4-year old children from the Canadian National Longitudinal Survey of Children and Youth (NLSCY).
Method	Longitudinal, prospective survey.
Outcomes	Mother's reports of hyperactivity, physical aggression, pro-social behaviour, unhappy mood and anxiety.
Controls	Maternal employment status, type of care, participation in organised activities, positive interactions with mothers, reading with parents, hours watching TV per day, mother's age, foreign born status,

	and education, father's presence, employment status, and earnings, child's gender, health status, and siblings.
Conclusion	**Maternal employment is related to positive behavioural outcomes.** Maternal employment includes both benefits and costs for children. Employment means less positive interactions with the mother which in turn leads to more hyperactivity, more physical aggression, less pro-social behaviour, and more anxiety. These costs may depend on the type and quality of care and the home environment. After controlling for mediating variables, however, maternal employment is related to better socio-emotional outcomes: less hyperactivity, more pro-social behaviour and less anxiety. Maternal employment can be an advantage for children, but not if they experience long hours of non-parental care and few positive mother-child interactions.

Study	**Peisner-Feinberg et al., 2001**
Participants	733 children from 4 to 8 years old in community child-care centres from the Cost, Quality and Child Outcomes (CQO) in Child Care Centres Study, 31% from diverse ethnic groups, 82% in two-parent families.
Method	Longitudinal study: 5-year period from pre-school through second grade, with measures of the quality of the preschool setting.
Outcomes	Teacher reports: Classroom Behavior Inventory (CBI), Student-Teacher Relationship Scale (STRS).
Controls	Family selection factors: mother's education, family's monthly income, ethnicity, gender, age of entry into child care.
Conclusion	**Higher quality care is more beneficial, but family characteristics are even stronger related to children's behaviour.** Children in care with higher quality have better socio-emotional outcomes over a 5-year period. The effects of child care quality are stronger for children from more at-risk (less advantaged) backgrounds. Family characteristics (maternal education), however, have a stronger relation with children's behaviour than the quality of child care. The authors stress a bio-ecological perspective and point to the interaction within multiple environments that constitutes children's development.

Study	**Vandell & Corasanti, 1990**
Participants	236 white middle class 8-year old children from Texas, a state with minimal child care standards, 72% from two-parent families.
Method	Child care is reported retrospectively. Children with 5 different child care histories are contrasted.
Outcomes	Multiple assessments: Teacher, parent, child and peer ratings of: emotional well-being, peer relationships, cooperation and compliance.
Controls	Family social class, parents' marital status, family size, number of family moves, child gender, childbirth order and current after school care.
Conclusion	**The more non-parental child care the more problem behaviour.** Children with more extensive child care have more poor peer relationships, work habits, emotional health, are more difficult to discipline and have more negative nominations from classmates. When considering several relevant factors children's extensive experience in infant care was the single best predictor of negative ratings by parents, teachers and peers. The results are only valid for this group of children and can not be generalised to other contexts with different quality of child care and of the home environment.

The results of those studies which have been included are not homogeneous; indeed, sometimes they are even contradictory. Some show clear relationships between child care and children's behaviour, whereas others show there is no such relationship. This could be due to the various research designs and settings. Furthermore, as explained in the introduction of this thesis, "it appears that no single overarching conclusion about child care effects can be drawn" (Vandell & Corasanti, 1990, p. 571). It is possible, however, to extract relevant factors. In the first place family characteristics, such as maternal education, play an important role in the development of children's behaviour. These factors should therefore be considered while studying child care and children's behaviour. Whilst non-parental care during the first year of life is not related to children's behaviour, the *total* amount of care does matter. A larger amount of child care predicts negative behaviour when the quality of care is low and positive behaviour when the quality is higher. In addition, ethnicity and coming from an at-risk background can explain why some children's behaviour is related to child care experiences and other's not.

Research questions and hypotheses

The aim of this study is to investigate whether the quantity of child care is related to children's direct and indirect aggression as reported by teachers. Furthermore this study aims to analyse whether this relationship still holds when the influences of ethnicity, gender, socio-economic status, maternal education and positive and negative parenting are controlled for.

Child care in Switzerland

Before defining the direction of the hypotheses it is important to know more about child care in Switzerland. As set out in the review above, the quality of care can determine whether child care is positively or negatively related to aggressive behaviour. The quality of child care differs significantly between countries. In Sweden, for example, where the quality is high, enrolment in child care predicts positive behavioural outcomes, whereas in Texas, where the quality is low, child care experiences are linked with negative outcomes. This study does not have information about the quality of child care. To define hypotheses this study therefore uses information about the average quality of child care in Switzerland. Despite the fact that this is difficult to measure, some indicators can give an idea of the quality. The first indicator is the child-to-staff ratio in day-care. Compared to other countries around the world Switzerland has got an average to high child-to-staff ratio, which means that the frequency of interactions between children and care-givers is relatively low (OECD[4], 2007b). Another indicator of quality is public spending on child care. In comparison to other countries the Swiss government spent little money on child care as per cent of GDP[5] in 2003 (OECD, 2007a). This indicator could be misleading, however, because it does not include spending by local governments. It may be possible that local governments spend additional money on child care. It seems, however, that they spend little money on child care, because state-provided child care is rare in Switzerland. Several organisations, including the OECD and the United Nations, conclude that Switzerland lacks a family-friendly policy (Djurdjevic, 2005; OECD, 2004; United Nations, 2002). Only 4% of Swiss families find suitable child care, compared to 60 percent of Swedish and 51% of Norwegian families (Gysin, 2000). In short, finding high quality, affordable child care is difficult in Switzerland and the rough indicators mentioned above show that the average quality of child care in Switzerland is not high. Therefore this study expects to see more aggressive behaviour when Swiss children experience a large amount of child care.

Hypotheses one and two

The first two hypotheses are targeted at the relationship between the amount of child care and aggressive behaviour. The relationship will be investigated for boys and girls together and separately. Furthermore, the hypotheses will be investigated eight times with a different period of child care: child care during the first, second, third, fourth, fifth and sixth year of life, child care during all first six years of life and child care in the year before measurement (2004). The reason to look at these separate periods is to see whether every phase is equally related to aggressive behaviour or not. According to

[4] OECD is the Organisation for Economic Co-operation and Development.

Attachment Theory (see Theoretical background) the first year of a child's life is most significant, whereas according to the other discussed theories later years are equally important, if not more essential.

> *Hypothesis one:* Children who experience more child care show more direct aggressive behaviour.
> *Hypothesis two:* Children who experience more child care show more indirect aggressive behaviour.

The operationalisation of direct and indirect aggression is discussed in the next chapter.

Hypotheses three and four

After analysing whether there is any relationship between child care experiences and aggressive behaviour in hypotheses one and two, hypotheses three and four include the control variables ethnicity, gender, socio-economic status, maternal education and positive and negative parenting. When the data show a relationship this does not mean that child care causes aggressive behaviour. To analyse a causal relationship child care should be randomly assigned to children in an experimental design. Without an experimental design other factors determine the amount of care children experience. If these family and child factors are also linked to the development of aggressive behaviour, a relationship between child care and aggression could be explained by these factors. A large amount of child care, then, is only a risk-marker for the development of aggressive behaviour. In addition, it is obvious that there are many factors that influence and interact in the development of aggressive behaviour (see for example Moffitt, Caspi, Rutter & Silva, 2001). By including some of these factors in the analyses it is possible to say something about the relative influence of child care experiences and these factors.

> *Hypothesis three:* Children who experience more child care show more direct aggressive behaviour, when controlling for ethnicity, gender, socio-economic status, maternal education and positive and negative parenting.
> *Hypothesis four:* Children who experience more child care show more indirect aggressive behaviour when controlling for ethnicity, gender, socio-economic status, maternal education and positive and negative parenting.

The following paragraph describes how the study has been carried out to test the above-mentioned hypotheses.

[5] GDP is Gross Domestic Product, which is a way to measure the size of a country's economy.

Method

Sample

The data used in this study were collected for z-proso (the Zurich Project on the Social Development of Children). A sample was drawn from all children who started primary school in the city of Zurich in 2004, while children from socially disadvantaged districts were over-sampled to increase the proportion of at-risk respondents[6]. The mean age of the children was seven years old. For the analyses in this article only children between six and eight years old were included. Some children were too old to have a complete child care history from birth, while others were too young to have a history up to six years. Furthermore, children for whom data was missing in regard to child care or aggressive behaviour were not included. Depending on the specific analysis, the sample ranged from 981 (information on socio-economic status) to 1093 children. Table 2 shows the distribution of child care in different phases, while table 3 shows what proportion of the children were in which type of child care at different ages. As children grow older the quantity of child care increases, but the majority of children still experiences child care for one day a week or less. In the first year of life, most children are in family care and this gradually lessens as they become older. After the first year, centre care is most common for the following four years, except for the sixth year of life, when after school care is most frequent. Furthermore, experiencing more than one type of care becomes more common when children grow older.

Table 2 Children's day-care quantity in days a week during the different periods in % (n = 1093)

	Age / phase							
Day-care	0-1	1-2	2-3	3-4	4-5	5-6	0-6	Last year
1 or less	76	68	57	50	48	44	61	61
2	13	13	16	19	19	29	13	13
3-4	5	10	15	17	18	19	13	14
5 or more	6	9	12	14	15	8	13	12

Table 3 Distribution of children among different types of child care in % (n = 1093)

	Age					
Type	0-1	1-2	2-3	3-4	4-5	5-6
Centre care	30	39	45	41	28	10
Family	40	31	20	13	11	16
Day-care mother	19	13	10	7	7	11
Neighbours/acquaintances	4	2	3	2	2	7
After school care	-	-	-	19	24	31
Mixed - more than one type	7	15	22	18	28	25

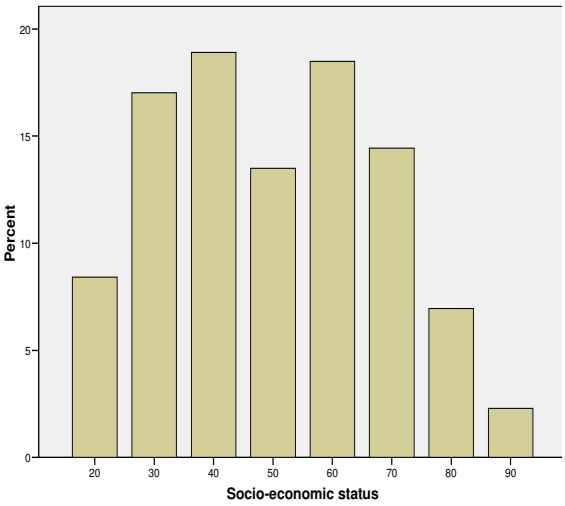
[6] For an extensive description about the sampling procedures in z-proso see Eisner and Ribeaud (2004) or go to http://www.z-proso.unizh.ch/Einleitung/einleitung.en.html

The sample is socio-economically and ethnically diverse as seen in Figure 3 and table 4: it contains children from lower, middle as well as upper-class, and more than half of the children have parents who were not born in Switzerland.

Table 4 Birth country of children and parents in % (n = 1093)

Country of birth in %	Child	Father	Mother
Switzerland	90	42	44
Former Yugoslavia	2	16	14
Germany	2	4	5
Italy	0	4	2
Portugal	1	5	5
Turkey	0	5	4
Sri Lanka	0	5	4
Spain	0	2	2
Other Western countries	2	5	4
South-East Europe	0	1	2
Africa	1	6	5
Middle/far East	1	3	5
Latin-America	1	2	4

Figure 3 distribution of socio-economic status in the sample in %, ranging from 20= low to 90=high (n = 981).



Instruments and variables

The dependent variable in this study was *aggressive behaviour*. According to the Shorter Oxford English Dictionary (2002) aggression is defined as "behaviour intended to injure another person or animal". The intention involved in this definition is problematic: how do you know if someone intends to hurt another person or not? If it were possible to read someone's mind, this would be the most valid way of measuring intention; since this is not, most research relies on an observer's opinion whether the behaviour was intended or not. Kagan (1974, p. 109) claimed "that a young child cannot be aggressive until he has some psychic intention of injuring another". There is, however, debate about the age at which children can have this psychic intention (Tremblay, 2000). Moreover, anger and fear can sometimes lead to impulsive reactions which were not intended. Because it is problematic to determine whether the harmful behaviour was intended, Loeber and Stouthamer-Loeber (1998, p. 242) defined aggression as "those acts that inflict bodily or mental harm on others''.

Aggression can be separated in direct, *physical* and indirect, *relational* aggression. Physical aggression involves the body, whereas relational aggression concerns relations between people. Crick and Grotpeter (1995, p. 771) defined relational aggression as ''harming others through purposeful manipulation and damage of their peer relationships''. This study investigates physical and relational aggression separately. Although the two constructs and involved behaviours are related, it is unlikely that they have the same determinants (Bandura, 1973). Not everyone who is physically aggressive

shows relational aggressive behaviour and vice versa. Furthermore boys tend to show more physical aggression, while girls show more relational aggression (Tremblay, 2000). Therefore it is important to examine the two types of aggression separately.

Both physical and relational aggression were measured using the Social Behaviour Questionnaire (for more information about the SBQ see Tremblay et al., 1991). A paper-and-pencil version of the SBQ with a 5-point Likert scale (ranging from "never" to "very often") was given to teachers. Items concerning physical aggression were "gets into fights", "physically attacks people", "kicks, bites, hits other children", "is cruel, bullies or is mean to others", "threatens people", "reacts in an aggressive manner when teased", "reacts in an aggressive manner when something was taken" and "reacts in an aggressive manner when contradicted". Items concerning relational aggression were "When mad at someone, child tries to get others to dislike that person", "When mad at someone, child says bad things behind the other's back" and "When mad at someone, child says to others: let's not be with him\her". This resulted in an interval variable of physical and relational aggression, which could range from one to five.

The target independent variable was the quantity of *child care* in different periods. This was reported using an Event History Calender (EHC), an instrument to obtain a structured picture of social and demographic events in someone's life (Caspi et al., 1996). Using a calendar, an interviewer asks the respondent to recall events. The interviewer first enquires about "key" events, that are easy to remember, such as marriage, childbirth, schooling, and first full-time job, working up to more difficult things. The positioning of key events on an EHC will help recall more difficult things. EHCs are a reliable and accurate technique for retrospectively collecting personal histories, because they resemble the structure of autobiographical memory (Belli, 1998). In z-proso one of the child's parents[7] gave information about events in their child's life since birth during a computer-assisted personal interview (CAPI) at the parents' home. If the parents did not speak German, it was possible to interview them in other languages such as Albanian, Serbo-Croat, Portuguese, Italian, Turkish, Spanish, Tamil and English. One of the things parents were asked about was child care. For each quarter of a year they reported how many days a week the child was in external care, ranging from centre care, family care, care by neighbours or acquaintances, day-care mothers to after school care. This is 'normal' care, in principal available for everyone, where children go because their parents have other occupations. When z-proso started it was decided that external child care would only be reported if the child was in external care for more than two days a week, not if it was only one day a week. To be able to do analyses the variable was therefore recoded in groups: low = 0-1 days a week, low-medium = 2 days a week, high-medium = 3-4 days a week and high = 5 days a week or more. Mean variables were computed to represent the eight periods: the first six years of a child's life, every year separately and the last year before measurement. This led to eight ordinal variables of the amount of child care in different periods.

For hypotheses three and four, six independent variables, collected in interviews with the parents, were added to the analyses. The first background variable was the child's *gender.* As

[7] In most cases the female primary care-taker (FPC) was interviewed, but sometimes the male primary care-taker (MPC) or someone else closely linked to the child provided the information. These people are not always the biological parents, but for reasons of clarity this thesis will refer to the interviewed people as parents.

mentioned before boys tend to be more physically aggressive, while girls show more relational aggression (Tremblay, 2000). Moreover, some earlier studies have reported a different relationship between child care and behaviour for boys and girls (Howes & Olenick, 1986; Votruba-Drzal, Coley & Chase-Lansdale, 2004). Considering gender is therefore essential when investigating this relationship.

The next variable was *socio-economic status* (SES), which was the mean of the female and male primary care-takers' (FPC and MPC) SES. This value is based on Ganzeboom, De Graaf and Treiman's (1992) International Socio-Economic Index of occupational status (ISEI88), ranging from 0 to 100 and derived from information concerning education and income (see for operational procedures Ganzeboom & Treiman, 1996). The third background variable was *maternal education* and the fourth was *ethnicity,* operationalised as the FPC's birth country.

As discussed in the chapter on theoretical background, parenting practices are important in the development of aggression. Poor monitoring and supervision, inconsistent discipline and physical punishment are related to delinquent and violent outcomes later in life (Farrington, 2002). In contrast, involvement and positive parenting can prevent such behaviour. Therefore this study also looked at parenting practices, which were measured with the Alabama Parenting Questionnaire (for more information about the APQ see Shelton, Frick & Wootton, 1996). *Positive parenting* was computed from the involvement and positive parenting scales; *negative parenting* consisted of poor monitoring, inconsistent discipline and corporal punishment. Table 5 shows a summary of the variables.

Table 5 Variables, measures and measure levels

Variable	*Measure*	*Measure level*
Dependent		
physical aggression	SBQ, filled in by teachers.	ordinal/interval
relational aggression	SBQ, filled in by teachers.	ordinal/interval
Independent		
Child care	Collected with Event History Calendar. groups: low = 0-1 days, low-medium = 2 days, high-medium = 3-4 days and high = 5 days a week or more. For eight periods: 1st, 2nd, 3rd, 4th, 5th, 6th year of life, all first six years of life and the last year before measurement.	ordinal
Gender	Girls = 1, boys = 0.	nominal
SES	Mean of FPC and MPC's SES (ISEI88) on a scale from 0 to 100.	interval
Maternal education	FPC's highest level of education on a scale from 0 to 10.	interval
Ethnicity	FPC's country of birth.	nominal
Positive parenting	APQ: involvement and positive parenting.	ordinal/interval
Negative parenting	APQ: poor monitoring, inconsistent discipline and corporal punishment.	ordinal/interval

Data analysis

To examine hypotheses one and two ANOVA-analyses were undertaken, in which child care was regarded as a nominal and aggression as an interval variable. To investigate hypotheses three and four categorical regression analyses (CATREG) were used in SPSS. While normal regression analysis can examine models with only interval variables, categorical regression makes it possible to analyse models with nominal, ordinal and interval variables. Since this study wanted to assess the influence of nominal variables, such as ethnicity and gender, and ordinal variables, such as child care and parenting on children's aggression, CATREG was chosen as a suitable way of data analysis. In CATREG nominal variables are quantified by assigning numerical values to the categories. After rescaling, nominal and ordinal variables are treated as interval in the procedure to find an optimal linear regression equation. But first of all descriptive analyses were carried out to get an idea of the data and correlations between the different variables.

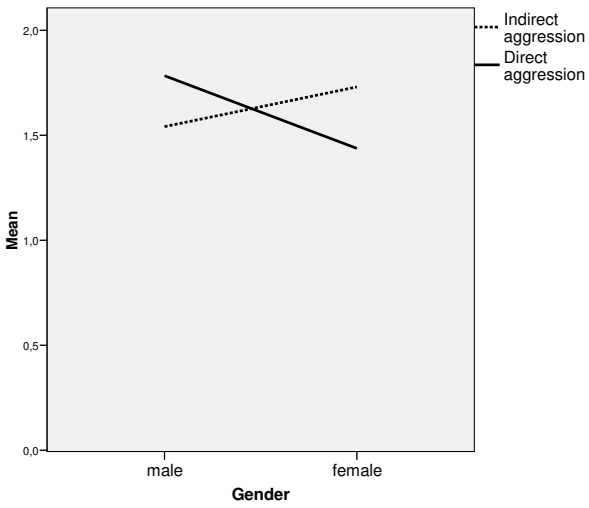
Results

Descriptive analyses

Table 6 (overlay) contains Pearson's correlations between the variables. The aim of this thesis is to examine the relationship between child care and aggression; table 6 shows that these two are modestly related. Correlations are higher for physical rather than for relational aggression, and more recent child care is more strongly related to aggression than child care in the first years of life.

The results also show that the constructs of physical and relational aggression are related (r = .634), but nevertheless different phenomena, as otherwise r would be around 1. This strengthens the decision to investigate the two constructs separately. Both types of aggression are correlated with gender, which is shown in figure 4. This corresponds with several earlier studies, which show that boys show more direct and girls more indirect aggression (Moffitt et al., 2001; Tremblay, 2000).

Figure 4 gender differences for direct and indirect aggression



Furthermore, physical aggression is related to negative parenting, which corresponds with Farrington's (2002) observation that inconsistent discipline, poor supervision and corporal punishment predict violent and delinquent behaviour later in life. Although these data show that child care and aggression are correlated, they are only *indicators* of relationships. In the next two paragraphs results of ANOVA analyses are presented to answer hypotheses one and two.

Direct aggression

Table 7 presents F-values for the ANOVA analyses undertaken to test hypotheses one and two. Hypothesis one predicts that children who experience more child care will show more direct aggression. The analyses show that this is not true for child care in the first and second year of life. There is no difference in direct aggression between children who experienced a different quantity of child care in these two years. From the third year of life the ANOVA-analyses show that there is a difference between these children. Furthermore, the total quantity of child care in the first six years of life is important. For girls, child care from the fourth year of life is relevant, while the analyses for boys show a different pattern. The third year of life is relevant for boys, but the total quantity is not. The ANOVA-analyses demonstrate the presence of group differences, but they do not show how the groups differ. Therefore Bonferroni Post Hoc tests were undertaken, which show that more child care is indeed related to more direct aggression. The low and low-medium child care group do not differ and in some periods the high-medium group is also equal to the first groups. The high group (five days a week or more child care), however, differs significantly from the first groups in direct aggression.

Table 6 Correlations between the variables

	CC 1st yr	CC 2nd yr	CC 3rd yr	CC 4th yr	CC 5th yr	CC 6th yr	CC first 6 yrs	CC 2004	Gender	Ethnicity	SES	Mat. education	Pos. p.	Neg. p.	Rel. aggress.	Phys. Aggress.
child care 1st yr	1															
child care 2nd yr	.783 **	1														
child care 3rd yr	.592 **	.779 **	1													
child care 4th yr	.479 **	.627 **	.819 **	1												
child care 5th yr	.411 **	.547 **	.689 **	.853 **	1											
child care 6th yr	.366 **	.476 **	.535 **	.641 **	.755 **	1										
child care first 6 yrs	.625 **	.773 **	.851 **	.883 **	.863 **	.741 **	1									
child care 2004	.297 **	.407 **	.465 **	.535 **	.619 **	.821 **	.624 **	1								
Gender	-.031	-.024	-.031	-.024	-.033	-.004	-.035	.006	1							
Ethnicity	.069 *	.117 **	.108 **	.117 **	.112 **	.070 *	.126 **	.050	-.017	1						
SES	-.019	.032	.057	.034	-.002	-.052	.037	-.066	-.003	.335 **	1					
Maternal education	.018	.081 **	.119 **	.106 **	.085 **	.033	.117 **	.005	.008	.234 **	.624 **	1				
Positive parenting	-.017	-.030	-.027	.007	.003	-.003	-.008	-.010	-.001	-.166 **	-.142 **	-.052	1			
Negative parenting	.052	.053	.020	.022	.067 *	.069 *	.063 *	.085 **	-.122 **	-.104 **	-.154 **	-.120 **	-.082 **	1		
Relational aggression	-.001	.046	.047	.070 *	.071 *	.102 **	.058	.116 **	.108 **	-.032	-.067 *	-.076 *	.095 **	.077 *	1	
Physical aggression	.028	.069 *	.092 **	.097 **	.112 **	.121 **	.099 **	.141 **	-.244 **	-.096 **	-.104 **	-.087 **	.089 **	.154 **	.634 **	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Hypothesis one is accepted for:

- all children for the third, fourth, fifth, sixth and most recent year and all first six years of life.
- girls for the fourth, fifth, sixth and most recent year and all first six years of life.
- boys for the third, fourth, fifth, sixth and most recent year.

For child care in other periods hypothesis one is rejected.

Table 7 ANOVA-outcomes for hypotheses one and two: quantity of child care and aggression

	Direct aggression			**Indirect aggression**		
	Hypothesis one			*Hypothesis two*		
	All children	**Girls**	**Boys**	**All children**	**Girls**	**Boys**
Period	**F.**	**F.**	**F.**	**F.**	**F.**	**F.**
First year	2.365	.372	1.985	.468	.266	2.661 *
Second year	2.037	1.004	1.266	1.906	2.027	.625
Third year	3.891 **	1.343	2.938 *	1.959	1.301	1.810
Fourth year	7.467 ***	6.162 ***	3.895 **	5.705 ***	3.877 **	2.644 *
Fifth year	11.249 ***	6.207 ***	6.468 ***	4.234 **	2.437	2.690 *
Sixth year	7.592 ***	7.469 ***	3.384 *	4.637 **	4.103 **	1.894
First six years	4.810 **	3.478 *	1.933	4.002 **	4.700 **	1.787
Last year	12.241 ***	9.698 ***	4.232 **	5.887 ***	4.540 **	1.265

* p < .05
** p < .01
*** p < .001

Indirect aggression

Hypothesis two predicts more indirect aggression for children who experience more child care. The analyses (table 7) show that this is not true for the first three years of life. Child care in the fourth, fifth and sixth year, in the total first six years and the most recent year, on the contrary, do make a difference. Furthermore, for girls, the fifth year of life is not significant, for boys only the first, fourth and fifth year are significant. Post Hoc tests show the same as with direct aggression: children who experience a low or average quantity of child care do not differ in indirect aggression, but children who experience a large quantity of child care show more indirect aggression.

Hypothesis two is accepted for:

- all children for the fourth, fifth, sixth and most recent year and all first six years of life.
- girls for the fourth, sixth and most recent year and all first six years of life.
- boys for the first, fourth, and fifth year of life.

For the other periods hypothesis two is rejected.

Figure 5 and 6 (overlay) visually display the differences in direct and indirect aggression for groups of children with different child care quantities in the last year before measurement. The next paragraph presents the results of categorical regression analyses, which investigate whether child care remains significantly related to aggression when the influence of other factors are considered

Figure 5 mean direct aggression for different quantity of child care

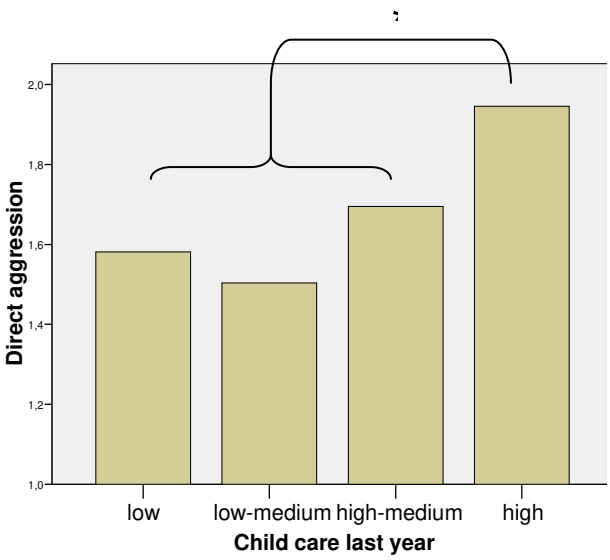
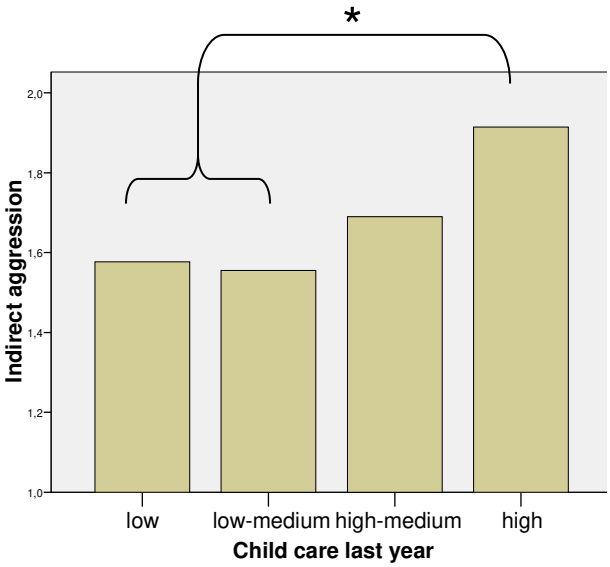


Figure 6 mean indirect aggression for different quantity of child care



* p < .05

Categorical regression analyses

A summary of the results for the categorical regression analyses is presented in table 8 (overlay), which shows the F-values of child care as a predictor of aggression when other factors are included in the analyses and whether this is a significant predictor. Next, the table gives the R square which is an indicator of the variance that is explained by the model. Also, the three most important predictors are given. The explained variance for direct aggression ranges from 14% to 16%, which means that around 85% of the variance in aggression between people can be explained by other factors than the ones included in the model. For indirect aggression the R square is even lower; ranging from 7% to 9%.

Child care in the first year of life is no significant predictor for direct or indirect aggression, as could be expected after the analyses for hypotheses one and two. In the following years child care is a significant predictor, but the relative importance is low compared to other factors. Direct aggression is best predicted by gender, followed by negative parenting and ethnicity. Positive parenting, socio-economic status and maternal education are the least important predictors for direct aggression. As mentioned before, boys show more direct aggression than girls. Furthermore, when children experience more negative parenting, they will show more direct aggression. The model predicts that children with mothers born in Brazil and North Africa show more direct aggression than children with mothers born in Sri Lanka, while children from Swiss-born mothers are in the middle of the range. Child care in more recent years is a more important predictor than child care in the first years of life; in the last year before measurement child care is the third most important predictor for direct aggression.

Ethnicity is the most important predictor for indirect aggression and, depending on the child care period, positive parenting, gender, and child care are the second most important predictors. Looking at ethnicity, the same pattern appears as with direct aggression: having a mother born in Brazil or North Africa predicts more indirect aggression compared to having a mother born in Sri Lanka. Negative parenting and socio-economic status are the least important predictors for indirect aggression.

Table 8 Summary of categorical regression analyses for hypotheses three and four.

	Direct aggression *Hypothesis three*				Indirect aggression *Hypotheses four*			
Period	**F.**		**R square**	**Importance?**	**F.**		**R square**	**Importance?**
First year	.525		.141	1. Gender 2. Negative parenting 3. Ethnicity	.388		.068	1. Ethnicity 2. Positive parenting 3. Gender
Second year	4.113	*	.144	Same as above	4.906	**	.072	Same as above
Third year	9.399	***	.148	1. Gender 2. Ethnicity 3. Negative parenting	6.153	*	.073	Same as above
Fourth year	12.968	***	.151	1. Gender 2. Neg. Parenting 3. Ethnicity	17.727	***	.083	1. Ethnicity 2. Child care 3. Positive parenting
Fifth year	15.643	***	.153	Same as above, but child care becomes more important.	12.461	***	.078	1. Ethnicity 2. Positive parenting 3. Child care
Sixth year	18.822	***	.156	Same as above	15.477	***	.080	1. Ethnicity 2. Child care 3. Positive parenting
First six years	8.884	***	.148	1. Gender 2. Negative parenting 3. Ethnicity	10.589	***	.089	1. Ethnicity 2. Gender 3. Maternal education
Last year	23.915	***	.160	1. Gender 2. Negative parenting 3. Child Care	14.741	***	.079	1. Ethnicity 2. Child care 3. Positive parenting

* $p < .05$
** $p < .01$
*** $p < .001$

Hypothesis three and four are accepted for:

- child care in the second, third, fourth, fifth, sixth and most recent year and all first six years of life.

For the other periods hypothesis three and four are rejected. It must be noted that child care, though significant as a predictor, only explains a small bit of the variance in direct and indirect aggression between children.

Theoretical relevance

Figures 7 to 10 (overlay) show interactions of parenting and child care on aggression. Figure 7 and 8 are relevant for social learning theory. In the theoretical background chapter, it was predicted that if children experienced much negative parenting in combination with a large amount of child care, the effects of negative parenting would be less, because children spent less time with their negative role models, which in turn would lead to less aggression. Figure 7 shows the opposite: negative

parenting and a large quantity of child care is associated with more direct aggression. In general, this figure shows that more negative parenting is associated with more direct aggression. There is no clear interaction between negative parenting and indirect aggression (figure 8). Although these results differ from the predicted interaction, they do not contradict social learning theory. This study does not have information about the role models in child care and their influence can therefore not be examined. It could very well be possible that these role models show negative behaviour and thereby promote the development of children's aggressive behaviour, which fits in social learning theory.

Figure 7 Interaction between child care and negative parenting on direct aggression.

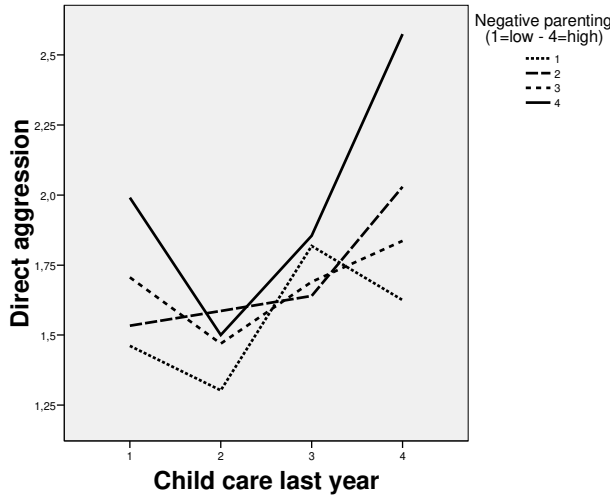


Figure 8 Interaction between child care and negative parenting on indirect aggression.

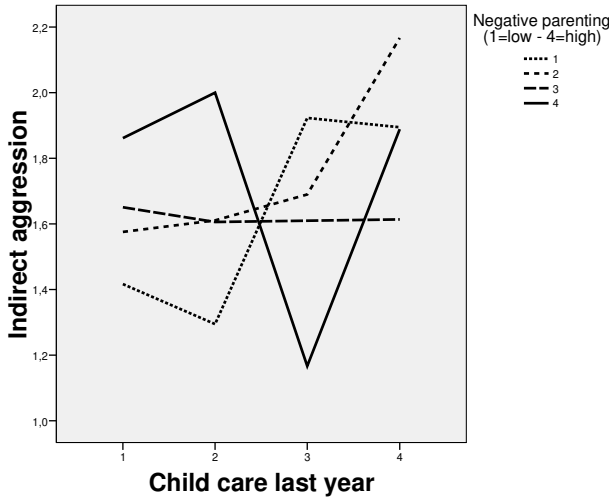


Figure 9 Interaction between child care and positive parenting on direct aggression.

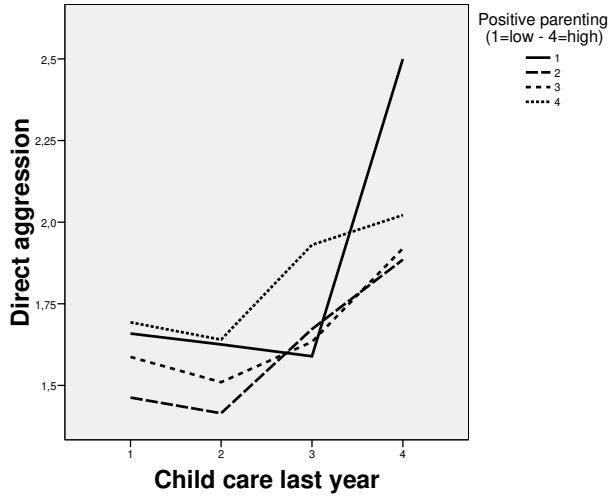
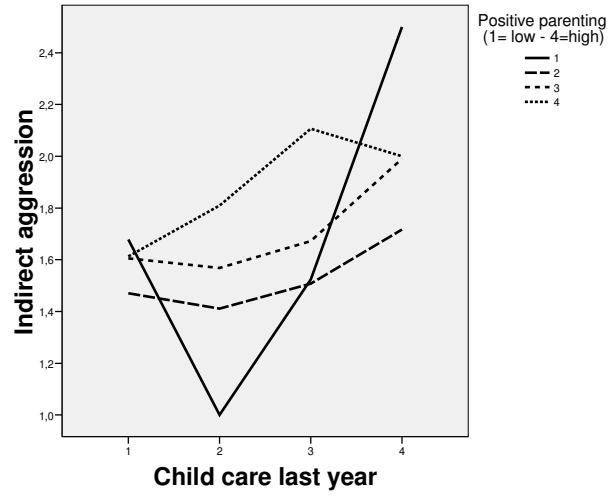


Figure 10 Interaction between child care and positive parenting on indirect aggression.



Figures 9 and 10 are relevant to the stress modulation theory, which posits that children need sensitive parents to reduce stress experienced after a day of child care. If parents are sensitive to their children's needs, a large quantity of child care is not associated with more aggression. If parents are not sensitive, children's stress levels stay high, which will lead to more aggression. Figure 9 shows that children with the least positive parenting and the highest quantity of child care show the most direct aggression. For indirect aggression, the interaction is only visible for the highest level of child care; children who experience the least positive parenting show most indirect aggression. For lower levels of child care this is not the case. These figures tend to support the stress modulation theory, but, as noted before, cannot give evidence against or in favour of the theory, because there is no information about cortisol levels.

This study's results do not support attachment theory, which claims that separation from the parents in the first year of life results in insecure attachment, which in turn will lead to more aggression. The data show that more child care in the first year of life is not related to direct or indirect aggression at age seven. The next chapter will summarise the research findings and discuss the implications and limitations of this study.

Discussion

This study investigated whether non-parental child care experiences are correlated with aggressive behaviour of primary school children in Zurich. It also examined the relative influence of gender, socio-economic status, maternal education, positive and negative parenting, and ethnicity on this relationship.

Non-parental care is indeed correlated with direct and indirect aggression, but whether the relationship is significant depends on the period in which the child experienced care. More recent care is more strongly related to aggression, while child care in the first year of life is insignificant. In addition, child care is more strongly related to direct rather than indirect aggression. Furthermore, children only show more aggression if they experience a large quantity of child care: five days a week or more. Children who experience less do not differ from each other. The results are more significant for girls rather than for boys, a finding which contradicts earlier studies that suggested that boys are more sensitive to child care experiences (Howes & Olenick, 1986; Votruba-Drzal, Coley, & Chase-Lansdale, 2004).

If other factors are included in a regression model child care is still a significant predictor for direct and indirect aggression. It is not the most important predictor however: being a boy or a girl is the most important for direct aggression, while ethnicity is most important for indirect aggression. The regression models explain between 14% and 16% of the variance in direct aggression between children and between 7% and 9% of the variance in indirect aggression. Although child care is a significant predictor in these models, the contribution to the development of aggression is small.

These results are comparable to Vandell and Corasanti's (1990), but contradict Andersson's (1989; 1992), both discussed in the review. In contrast to the present study, Andersson found that more child care was related to less problem behaviour. The finding that more rather than early child care is related to behavioural outcomes resembles Bates et al.'s (1994), Belsky and Eggebeen's (1991), and Burchinal et al.'s (1995) results. Like Peisner-Feinberg et al. (2001) the present study also found that other factors, such as gender and ethnicity are more strongly related to aggression than child care.

Because this study does not have an experimental design, it cannot prove that child care causes aggression. It could be the opposite: children who show more aggressive behaviour will experience more child care, for example because their parents are tired of caring for their aggressive children. Or, as mentioned before, child care effects could be moderated by other factors such as temperament: children with difficult temperament adapt less easily to child care and will therefore develop more aggressive behaviour than children with an easy temperament (Crockenberg, 2003; De Schipper, Tavecchio, Van IJzendoorn & Van Zeijl, 2004). Although this study cannot draw conclusions about cause and effect, it is possible to examine if the data support or contradict theories. Child care in the first year of life, for example, is not related to direct or indirect aggression, which contradicts attachment theory. In addition, if children experience negative parenting and a large quantity of child care at age seven, a cumulative effect seems to take place: these children show the highest level of direct aggression compared to children who experience less child care and less negative parenting.

Also, children who experience the least positive parenting with the highest level of child care show most aggression. This result is in concordance with the stress modulation theory, which states that children need positive, sensitive parents to modulate stress experienced by child care.

A limitation of this study is the absence of quality measures, because these can determine whether child care has a detrimental or beneficial effect (Berk, 2000; Hennessy, Martin, Moss & Melhuish, 1992; Howes, 1987). This study also does not control for caregiver stability or group size, which can influence the relationship between child care and children's behaviour (Allhusen & Cochran, 1991; Howes, 1987). Furthermore, it was not possible to differentiate between children who experienced no child care or those who experienced child care for one day a week.

One of the strengths of this study are it's independent measures of children's aggression. Aggression is reported by teachers who did not have knowledge about child care histories. Furthermore, as far as known, this is the first study of child care and aggression conducted in Switzerland. It shows that children who experience a large quantity of child care in Switzerland are more likely to show a high level of direct and indirect aggression.

This study has given some hints to explain the relationship between child care, aggression and other factors, but cannot give evidence for these explanations. Future studies should focus on the mechanisms which can explain this relationship. A suggestion is to examine the difference between direct and indirect aggression, because the former is more strongly related to child care than the latter. Perhaps social learning theory can explain this: direct aggression is more overt and therefore more sensitive to social modelling. The difference could also be due to measurement problems: because indirect aggression is less overt it is harder to measure for teachers in a questionnaire. One could also focus on the difference between boys and girls. Although this study showed a difference, it cannot explain why the relationship between child care and aggression is stronger for girls rather than for boys. A final suggestion is to investigate the quality and type of child care in relation to children's behaviour. Studies conducted in the U.S. show that the quality and type of non-parental care can determine whether it is positively or negatively related to children's behaviour and it would be good if this will be further investigated in Europe, because the circumstances in Europe are not easily comparable to the U.S. (Dettling et al., 2000; Howes, 1987; Peisner-Feinberg et al., 2001).

Although it is not possible to answer the 'big' question if child care is detrimental or beneficial for children, this study adds valuable information to the knowledge about the relationship between non-parental care and children's aggression. First, child care in the first year of life is not related to aggression around age seven. Furthermore, only extensive child care, five days a week or more, is related to more aggression. It seems that parents and policy makers do not have to worry about non-parental care in infancy or about care for a few days a week, but external care for five days a week or more should be avoided.

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